WHAT IS CLAIMED IS:

1. An apparatus for controlling the operation of the data channel in a mobile communication system that simultaneously a control message over the data control channel and the data over the data channel and supports hybrid automatic repeat request (HARQ), the apparatus:

a physical layer for receiving the traffic data and the control message from the data control channel and the date channel seperately and decoding the received traffic data and control data;

a physical layer's HARQ controller for calculating the decoded results received from the physical layer and controlling the physical layer according to the calculating result.

2. The apparatus of claim 1, wherein the physical layer's HARQ controller comprises:

an HARQ state machine for controlling state transition of an initial state for initializing parameters while waiting for a control message to be received over the packet data control channel received from the physical layer, a decoding state for decoding the control message, a control state for calculating the decoding result, a demodulation state for demodulating packet data on the packet data channel, a decoding state for turbo decoding the demodulated packet data, and a response state for transmitting the turbo-decoding result; and

a state function section for controlling state transition of the HARQ state machine depending on a processing result of the physical layer.

3. The apparatus of claim 1, further comprising a data path processor for controlling a processing path of data received over the packet data channel.

4.   The apparatus of claim 1, further comprising an output buffer controller for storing data obtained by demodulating and decoding data received over the packet data channel and outputting the stored data to the HARQ controller.

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5.   The apparatus of claim 2, wherein the HARQ state machine is dualized.

6.   The apparatus of claim 5, wherein if a response delay time

10 comprises 2 slots, each of the dualized HARQ state machines alternately controls the state transition for 2 slots for the data received over the packet data channel.

7.   The apparatus of claim 6, wherein when transmitting a signal for decoding of the packet data to the physical layer, the HARQ state machine

15 controls transition to a waiting state until an operation of the decoder is ended.

8.   The apparatus of claim 7, wherein the state function section comprises:

first state processors for performing control operations of the associated

20 dualized HARQ state machines in the initial state;

a second state processor for performing control operations of the HARQ state machines in the control state;

a third state processor for performing control operations of the HARQ state machines in the demodulation state;

25   a fourth state processor for performing control operations of the HARQ state machines in the waiting state;

a fifth state processor for performing control operations of the HARQ state machines in the decoding state; and

sixths state processors for performing control operations of the

associated HARQ state machines in the response state.

9.   The apparatus of claim 1, wherein the physical layer comprises one data channel turbo decoder.

10.   The apparatus of claim 1, wherein the decoder is a turbo decoder.

11.   An Apparatus of claim 1, wherein the physical layer's HARQ controller requests a retransmission of the traffic data to the physical layer of the mobile communication system when the result of the decoded data is bad.

12.   An apparatus of claim 1, wherein the physical layer's HARQ controller transmits the decoded data to an upper layer when the result of the decoded data is good.

13.   An apparatus of claim 1, wherein the physical layer comprises a decoder for decoding received control data, a demodulator for demodulating the data, and a decoder for decoding the demodulated data.

14.   An apparatus of claim 13, wherein the physical layer's HARQ controller determines whether to demodulate the data depending on the decoded control data and outputs the decoded control data to the demodulator and the decoder when the HARQ controller determines to demodulate the data.

15.   An apparatus of claim 1, wherein the physical layer's HARQ controller determines whether to demodulate the data depending on the calculated result and outputs the result of the decoded control data to the physical layer when the HARQ controller determines to demodulate the data.

16.   An apparatus of claim 1, wherein the physical layer's HARQ controller determine whether to demodulate and decode the received data depending on a decoding result of the control message, outputs the decoded control message to the demodulator and the decoder during demodulation and decoding of the received data, controls output of a response signal according to a decoding result of the data.

17.   An apparatus of claim 1, wherein the physical layer's HARQ controller delivers the decoded data to the upper layer.

18.   An apparatus of HARQ (Hybrid Automatic Repeat Request) controller for retransmitting data in a mobile station of a mobile communication system, the HARQ controller comprising:

an HARQ state machine for receiving state information from a physical layer and determining a transition result of a next state to a state function section; and

a state function section for indicating an operation of the physical layer according to the determined result from the HARQ state machine.

19.   The apparatus of claim 18, wherein the mobile station receives a data channel and a control channel for transmitting control information for decoding the data channel.

20.   The apparatus of claim 19, wherein the mobile station includes a control channel decoder for decoding the data channel, a data channel demodulator for demodulation the data, and a data channel decoder for decoding the demodulated data.

21.   The apparatus of claim 19, wherein the state function section

commands an operation of any one of the control channel decoder, the data channel demodulator and the data channel decoder, all of which are related to transition decision.